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GRC Environmental Programs Manual—Chapter 16

Stratospheric Ozone Protection

Approved by: Energy and Environmental Management Office Chief

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Change Record

Revision	Effective Date	Expiration Date	C-25, Change Request #	Description
A	4/2015	4/2020		Administrative Changes: Corrected name of office, corrected typos, changed SHED to SHeD, Added revision dates to forms.

***Include all information for each revision. Do not remove old revision data. Add new rows to table when space runs out by pressing the tab key in the last row, far right column.*

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Chapter 16—Stratospheric Ozone Protection

***NOTE:** This chapter is maintained and approved by the Energy and Environmental Management Office (EEMO). The last revision date of this chapter was March 2015. The current version is maintained on the Glenn Research Center internet at <http://www.grc.nasa.gov/WWW/FTD/EEMO/index.html>. Approved by: Chief of Energy and Environmental Management Office.*

1.0 PURPOSE

This chapter establishes policies and procedures pertaining to the procurement, use, handling, disposal, and overall management of ozone-depleting substances (ODSs), products made from or containing ODSs, and ODS substitutes at NASA John H. Glenn Research Center at Lewis Field and Plum Brook Station (GRC).

This chapter conforms to the GRC Environmental Management System (EMS) as defined in Glenn Procedural Requirement (GLPR) [8553.1](#) and supports GRC environmental policy, promoting pollution prevention, regulatory compliance, and continuous improvement.

2.0 APPLICABILITY

The requirements provided in this chapter applies to all GRC employees (civil servants, support service contractors, tenant organizations, or other employees) who purchase, use, handle, manage, or dispose ODSs, products made from or containing ODSs, or ODS substitutes. This chapter is applicable to a lesser extent to other offsite entities involved with GRC activities.

3.0 BACKGROUND

Scientists worldwide have concluded that chlorofluorocarbons (CFCs) deplete the ozone layer. CFCs have been used in the manufacturing of many products, such as foam insulation, electronics equipment, refrigerators, and air conditioners. When allowed to escape, these chemicals drift some 30 miles above the Earth to the stratospheric ozone layer—a layer of gas that screens us from the Sun’s powerful ultraviolet (UV–B) radiation. In the ozone layer, CFCs break apart; this process releases chlorine, which then attacks ozone. A single chlorine atom can destroy more than 100,000 ozone molecules.

The ozone layer is being depleted over [Antarctica](#) and to a lesser extent over North America and Europe. A depleted ozone layer allows more UV–B radiation to reach Earth harming human, animal, and plant life in many ways. Scientists around the world agree that increased [UV–B radiation](#) could cause a rise in cases of skin cancer and cataracts and could damage important food crops and marine ecosystems.

The United States and over 190 other countries are working together to protect the ozone layer by phasing out the production of ODSs in developed countries. In addition, the [Clean Air Act of 1990](#) contains requirements that ban the release of refrigerants during the service, maintenance, and disposal of air conditioning and refrigeration equipment and includes requirements for labeling products that are manufactured with or contain CFCs. Technicians must be certified in the proper use of the equipment and are required by law to use approved recovery or recycling equipment.

4.0 POLICY

It is GRC policy to phase out the use of all ODSs and products made from or containing ODS in all but critical applications. For the purpose of this policy, critical applications are those that are essential to the mission and have no proven, available, or cost-effective market alternatives.

5.0 RESPONSIBILITIES

5.1 All Employees

All employees (Civil Service, Support Service Contractor, Tenant Organization Employees, or Other) shall

- Seek replacements for ODS materials in their appliances and/or operations and evaluate their use of ODS for criticality with a life cycle assessment as described in Chapter [9](#) of the GRC Environmental Programs Manual. A waiver, in lieu of a life cycle assessment (LCA), may be requested from the chapter lead.

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- Ensure that appliances and/or operations that use ODSs or an approved substitute receive proper maintenance to prevent the release of these materials to the environment.
- Notify the chapter lead of any ODS leaks from appliances with a 50 lb or greater refrigerant charge.
- Obtain approvals from the Safety and Health Division (SHeD) Operations Team Chemical Management (CM) staff for ODS acquisitions as outlined in Chapter **15** of the GRC Environmental Programs Manual.
- Coordinate refrigerant disposals with GRC Waste Management (WM) as outlined in Chapter **5** of the GRC Environmental Programs Manual.

5.2 Safety and Health Division (SHeD)

SHeD Shall

- Chemical Management
 - Approves or disapproves the procurement of ODSs by reviewing for release all hazardous chemical purchase requisitions

5.3 Facilities Division and Plum Brook Management Office

Facilities Division and Plum Brook Management Office shall

- Maintain a preventive maintenance program that will ensure compliance with 40 Code of Federal Regulations (CFR) 82.156 with regard to leak repairs in appliances with a 50 lb or greater ODS charge
- Select and monitor certified contractors to service industrial heating, ventilating, and air conditioning (HVAC), refrigerant systems, and other related equipment
- Verify the use of Environmental Protection Agency (EPA)-certified refrigerant technicians using certified refrigerant containment recovery equipment during service, repair, removal, or recovery of industrial appliances to prevent the release of refrigerants to the environment as required by 40 CFR Part 82. These certifications may be tracked in NASA SATERN Program through the Training Office.
- Provide support and oversight for refrigerant reclamation and recovery
- Coordinate any industrial refrigerant disposals with the WM

5.4 Logistics and Technical Information Division

Logistics and Technical Information Division shall

- Verify the use of EPA-certified motor vehicle air conditioning (MVAC) technicians using certified refrigerant containment recovery equipment during service, repair, removal, or recovery of MVAC systems to prevent the release of refrigerants into the environment, as required by 40 CFR Part 82
- Provide support and oversight for refrigerant reclamation and recovery
- Coordinate any MVAC refrigerant disposals with the WM

6.0 REQUIREMENTS

6.1 Interfacing With Regulatory Agencies

EEMO shall be the official point of contact with regulatory agencies in regard to ODS.

6.2 Purchases of ODSs and Products Made From or Containing ODS Materials

Any purchase shall comply with the requirements of 48 CFR Part 1, 40 CFR Part 82, and Executive Orders 13693

6.3 Certified Technician Training

A certification from an EPA-approved training program as outlined in 40 CFR 82 is required of all technicians.

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6.4 Certified Refrigerant Equipment

A certification in accordance with 40 CFR 82 is required of all refrigerant recovery and recycling equipment.

6.5 Refrigerant Conservation, Containment, and Recovery Requirements

Any leak discovered in an appliance with a capacity of 50 lb or more shall be addressed as outlined in 40 CFR 82.156 (i) (9).

Prior to appliance disposal (except for MVAC and MVAC-like equipment and small appliances) a technician shall evacuate the refrigerants, as specified in 40 CFR 82.156 (a).

Prior to opening any appliances (except for MVAC) for maintenance, service, or repair, a technician shall evacuate the refrigerant in either the entire unit or the part to be serviced as specified in 40 CFR 82.156 (a).

7.0 RECORDS

- Preventive maintenance service records for appliances with a capacity of 50 lb or more shall be maintained by Facilities Division or contract organizations.
- Certified MVAC technicians list shall be maintained by Logistics and Technical Information Division or contract organizations.
- ODS inventory, technician qualification certificates, and maintenance logs shall be maintained by Plum Brook Management Office.

8.0 REFERENCES

Document	Name
40 CFR Part 82	Protection of Stratospheric Ozone
48 CFR Part 1	Federal Acquisition Regulation System
42 USC Title 42, Chapter 85, Subchapter VI	Stratospheric Ozone Protection
Executive Order 13693	Planning for Federal Sustainability in the Next Decade
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 14 , Acquisition of Hazardous Chemicals and Materials
GLM-FE-8500.1-5	Environmental Programs Manual, Chapter 5 , Management of Hazardous Materials and Waste for Reuse, Recycling, or Disposal

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APPENDIX A.—DEFINITIONS AND ACRONYMS

Appliance.—Any device that contains and uses a Class I or II ozone-depleting substance as a refrigerant.

Chemical Management (CM)

Chlorofluorocarbon (CFC)

Class I ODS.—A chemical with an ozone-depleting potential of 0.2 or greater. Some examples of chemicals in this category include trichlorofluoromethane (R-11), dichlorodifluoromethane (R-12), chlorotrifluoromethane (R-13), 1,1,2-trichlorotrifluoroethane (R-113), and 1,1,1-trichloroethane (NA 500).

Class II ODS.—A chemical with an ozone-depleting potential less than 0.2. Some examples of chemicals in this category include monochlorodifluoromethane (R-22), dichlorotrifluoroethane (R-123), dichlorofluoroethane (R-141b), dichloropentafluoropropane (R-225ca), and dichloropentafluoropropane (R-225cd).

Code of Federal Regulations (CFR)

Environmental Protection Agency (EPA)

Glenn Procedural Requirement (GLPR)

Glenn Research Center (GRC)

Heating, ventilating, and air conditioning (HVAC)

Life cycle assessment (LCA).—Comprehensive examination of a product's environmental and economic aspects and potential impacts throughout its lifetime, including raw material extraction, transportation, manufacturing, use, and disposal.

Motor vehicle air conditioning (MVAC) system.—Mechanical vapor compression refrigeration equipment used to cool the driver's or passenger's compartment of any motor vehicle. MVAC-like systems include similar systems up to a charge of 20 lb of refrigerant.

Ozone.—A bluish gas composed of molecules made up of three oxygen atoms. Nearly 90 percent of the Earth's ozone is in the stratosphere or ozone layer. This stratospheric ozone shields the Earth from harmful ultraviolet radiation produced by the Sun with wavelengths from 280 to 320 nanometers. Earth's remaining ozone or ground-level ozone is harmful to breathe and can damage lungs, trees, crops, and other materials.

Ozone-depleting potential (ODP).—The ratio of the impact on ozone of a chemical compared to the impact of a similar mass of trichlorofluoromethane.

Ozone-depleting substance (ODS).—A compound that contributes to stratospheric ozone depletion. ODSs are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete ozone. For regulatory purposes, ODS are listed or referenced in the applicable regulatory text. United States EPA maintains an up-to-date listing of ODS by class; Class I ODS is at <http://www.epa.gov/ozone/ods.html> and Class II ODS is at <http://www.epa.gov/ozone/ods2.html>.

Refrigerant.—Any Class I or II ozone-depleting substance or approved substitute with venting restrictions. This definition is inclusive of all usage categories.

Safety and Mission Assurance Directorate (SMAD)

Safety and Health Division (SHeD)

Small appliance.—Any appliance that is fully manufactured, charged, and hermetically sealed in a factory with 5 lb or less of a Class I or II ozone-depleting substance used as a refrigerant.

Technician.—Any person who performs installations, maintenance, service, repair, or disposal that could release refrigerants from appliances into the atmosphere.

Ultraviolet (UV-B)

Waste Management (WM)

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APPENDIX B.—FORMS

Class I or II Ozone-Depleting Chemical Purchase/Use Waiver Request Form

This form is used to request Class I or II ozone-depleting chemicals whose use is not concurrent with the phase out plan or use guidelines detailed in the Glenn Research Center, Environmental Programs Manual, Chapter 16, Stratospheric Ozone Protection.

Requestor's Name: _____ Date: _____
 Organization: _____ Phone: _____

Chemical Requested: _____
 Class and Amount: _____
 (See Title VI of the Clean Air Act Amendments of 1990 for chemical listings)
 Purpose for Material: _____
 Project Name: _____
 Equipment Location: _____

Is a substitute material for this chemical available? ___ YES ___ NO

Please explain the need for the requested material. Please include any extenuating circumstances:

Please detail the phase out plan:

Equipment Description: _____ Installation Date _____ Property ID _____
 Make _____ Model _____

This section to be completed by the Energy and Environmental Management Office (EEMO)

Is the phase out plan adequate? ___ YES ___ NO
 If NO, please attach revised plan
 Is this Waiver being granted? ___ YES ___ NO
 How long is this purchase/use waiver valid? _____

Signature of Requestor: _____ Date: _____

Signature of Stratospheric Ozone Protection Chapter Lead: _____ Date: _____

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